

Effectiveness and challenges of agricultural extension in Maros district: Analysis of approaches and methods

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Abstract: Community empowerment is essential in building an institutional system that allows individuals or community groups to achieve progress, prosperity, and independence. This study examines the role of agricultural extension in empowering rice farmer groups in Maros Regency, focusing on efforts to improve farmers' social welfare. Agricultural extension in this area plays a vital role in developing farmer capacity. However, its effectiveness is still influenced by the ability of extension workers to adjust delivery methods to local needs. This study uses a qualitative descriptive approach designed to provide a comprehensive and in-depth picture of the phenomenon being studied. Data were collected through triangulation, which involved three main techniques: documentation studies, in-depth interviews, and observations. The study results revealed that the group socialization method has helped reach many farmers, but there are challenges in ensuring that all farmers understand and can adopt new technologies effectively. To overcome this challenge, a more adaptive and personalized approach is recommended, such as individual visits and additional, more practical training, to ensure that extension can significantly improve farmer productivity and welfare. This study emphasizes the importance of regular evaluation of the extension methods used to adjust to farmers' needs and feedback to realize sustainable empowerment.

Keywords: *Agricultural extension, Farmer empowerment, Farmer groups, Maros regency, Social welfare.*

1. Introduction

Empowerment refers to various efforts made to strengthen the capacity of individuals, groups, or communities to achieve social, economic, and political welfare. The empowerment process often involves systematic efforts to give local communities power and capacity, so they have greater control over decisions and resources that directly impact their lives. This process is designed to increase the community's ability to influence change in the broader social system, which can positively impact their well-being [1]. In this case, empowerment is not only about providing tools or resources to the community but also about building critical awareness and the ability to act independently and collectively.

Moreover, empowerment is often understood as a collaborative process where individuals, communities, researchers, and other stakeholders work together to build capacity, influence policies, and create significant and sustainable change. This collaboration is essential because, through active participation, communities can increase their control over their destiny and ensure that the decisions truly reflect their needs and aspirations [2]. Thus, empowerment is not only a unilateral process but also involves dialogue, cooperation, and mutual understanding between the parties involved.

Community empowerment is essential in building an institutional system that allows individuals or community groups to achieve progress, prosperity, and independence. This process provides short-term benefits and prepares communities to face future challenges with more confidence and independence [3]. In addition, empowerment also plays a vital role in creating a more just and inclusive social structure where all individuals and groups have equal opportunities to contribute and benefit from development. Thus, empowerment is the foundation for building a stronger, more just, and prosperous society.

This study emphasizes the importance of women's involvement in community empowerment programs as a critical strategy to prevent marginalization and improve their economic opportunities. By involving women, empowerment programs open up economic opportunities for them and strengthen the community as a whole, as empowered women tend to reinvest the benefits they gain into their families and communities [4]. Recent research further emphasizes the importance of women's empowerment in communities. Studies show that when women are involved in savings and loan associations in villages, especially when accompanied by gender awareness programs for men, the positive impacts are very significant. These impacts include increased socio-economic well-being and improvements in maternal and child health in participating communities [5]. These results indicate that women's involvement in community development contributes to individual well-being and strengthens the overall social structure, which ultimately helps achieve more sustainable development outcomes.

Women's potential in society is often not fully accommodated, which results in limited access to public services and places them in a position that is highly vulnerable to poverty [6]. Research by Murembe, et al. [7] highlights the significant challenges that women face in accessing public services, which exacerbates their vulnerability to poverty. The study shows that without an in-depth and contextual approach, existing assistance programs often fail to reach the women who need them most, as specific contextual factors are not considered. Furthermore, a literature review by Vilar-Compte, et al. [8] confirms that women's access to essential services, such as healthy nutrition, remains limited, especially among poor urban populations. This limited access exacerbates women's social and economic vulnerability, leaving them further behind compared to other members of their communities. These findings emphasize the need for a more inclusive and contextual approach in designing empowerment and social assistance programs to ensure that women have equal access and can address existing social and economic disparities.

Furthermore, although technological innovations developed by the agricultural industry today are intended to make farmer's work more accessible, they often add to their burdens, especially for sharecroppers. Sharecroppers, who do not own land but manage it for owner farmers, face significant challenges in accessing agricultural tools produced by the industry. The cost of these tools is often very high, making them unaffordable for sharecroppers, especially those who are poor. As a result, there is a striking social gap between landowners and sharecroppers. Landowners only know the harvest from their land without being directly involved in the production process. Meanwhile, sharecroppers bear all the costs and efforts from planting to harvest but do not get a fair share of the benefits. Their income is reduced because they have to bear the high cost of buying agricultural tools, often making them financially distressed. This situation exacerbates sharecroppers' inequality and economic hardship and shows that technological innovations intended to help worsen their conditions.

To address the various challenges farmers face, the government has formed farmer groups assisted by agricultural extension workers. This initiative aims to improve the standard of living of farmers through empowerment that focuses on human resource development, including education, skills, and job creation. Agricultural extension workers play a vital role in this process, as they are responsible for transferring knowledge and skills to farmer group members and delivering government policy programs directly to farmers. Agricultural extension workers must have in-depth technical expertise and practical communication skills to perform their roles well. Good communication skills are essential to building interest and cooperation among farmers and ensuring that the information and advice provided genuinely align with their problems and needs. Thus, agricultural extension workers serve as

a bridge between government policies and farmers, facilitating the implementation of better agricultural practices and contributing to improving farmer welfare.

Rural development is a vital strategy to increase community empowerment and independence and to achieve welfare in various fields, including economic, socio-cultural, political, and environmental. Effective rural transformation requires community capacity building for sustainable development. Policies that support community empowerment in rural areas are essential to improving the quality of life in the area. According to Wang and Cao [9] interventions in the form of energy transition and sustainable agriculture can be the primary foundation of rural development. These interventions positively impact various aspects: social, economic, and environmental. The empowerment of rural communities can be seen in improving social and economic facilities and infrastructure and developing productive economic activities that involve active community participation. In addition, socio-economic institutions play a crucial role in providing capital, which supports community economic activities and strengthens socio-economic institutions in rural areas. With the proper support, rural communities can achieve greater independence and improve their overall quality of life. Figure 1 presents rice production data in Maros Regency from 2018 to 2022.

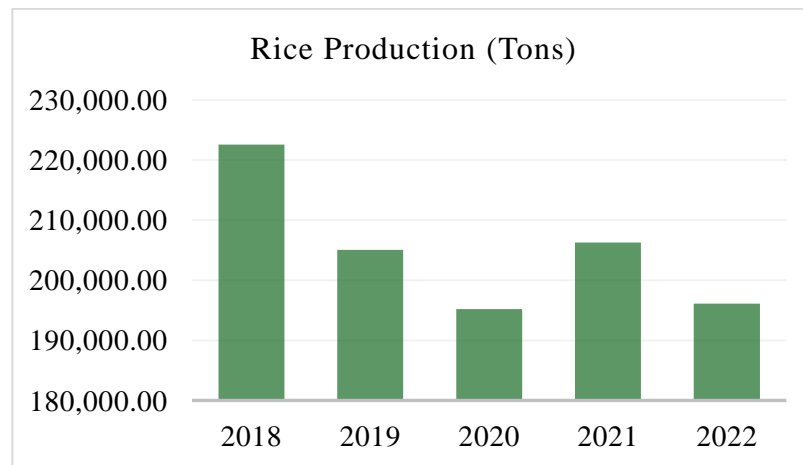


Figure 1.
Rice Production in Tons in Maros Regency.
Source: BPS, Area Sample Framework Survey (KSA).

Figure 1 shows the fluctuations in rice production over the past five years. In 2018, rice production peaked at 222,528.31 tons but experienced a significant decline in subsequent years, with the lowest production occurring in 2020 at 195,176.31 tons. Although there was a slight increase in 2021, production declined again in 2022. These fluctuations in production could reflect various factors affecting the performance of the agricultural sector in Maros Regency, including the effectiveness of extension programs and farmer empowerment. The decline in production during this period could indicate challenges farmer groups face in optimizing their harvest yields.

Several previous studies have explored various aspects of women's empowerment. One is a study by Henry Wahyuli and colleagues entitled "Women's Empowerment Through Sewing Training in Maju Jaya Village, Pemulutan District, Ogan Ilir Regency, South Sumatra Province." This study shows that sewing training provided to women, especially mothers, provides significant benefits because these skills can be used independently and sustainably, helping to improve their welfare [10]. Another study, by Resista Vikaliana and Andayani, entitled "Women's Entrepreneurship in Bogor through Processing Garment Waste Scraps into Accessories," highlights how entrepreneurship can empower women by involving them in processing scraps into accessories. This study outlines the stages needed to achieve empowerment through entrepreneurship [11].

A comparison between these studies shows that although all focus on women's empowerment, this study has a more specific approach. This study emphasizes the empowerment of young women, especially those who have just graduated from high school/vocational school. Thus, this study seeks to meet the specific needs of this group, offering relevant skills and opportunities to start their careers or businesses, distinguishing it from previous studies that are more general or focus on different age groups.

2. Methods

This study uses a qualitative descriptive approach designed to provide a comprehensive and in-depth picture of the phenomenon being studied. This approach is very relevant in complex research contexts because it can reveal nuances and interactions that quantitative approaches cannot express. Cottrell, et al. [12] explain that by using a multisystemic approach model, researchers can integrate various perspectives in data analysis, resulting in a more holistic and accurate understanding. This approach aims to analyze the main ideas related to the research subject deeply. Tramonti, et al. [13] emphasize that this method allows the exploration of various aspects that underlie the research subject, including social, cultural, and psychological contexts. This allows researchers to identify meaningful patterns that may not emerge in quantitative approaches.

Data was collected through triangulation, which involves three main techniques: documentation studies, in-depth interviews, and observations. Decker, et al. [14] explain that triangulation is an effective strategy to ensure the validity and reliability of data. Documentation Study involves analyzing documents relevant to the research subject, such as reports, archives, and other records, which help researchers understand the research context. In-depth Interviews aim to gather information directly from research subjects, thus gaining richer and more detailed insights into their perspectives and experiences. Observation is used to directly observe phenomena occurring in the field so that researchers can capture dynamics that may not be revealed in interviews or documents.

The data collection process is carried out carefully and systematically, following the procedures suggested by Equatora and Rahayu [15]. This procedure involves re-verifying data sources and using methods that allow validity checks, ultimately producing more reliable findings.

The data that has been collected is analyzed using a triangulation and interaction model. Gellatly, et al. [16] stated that this model helps check data validity by comparing the results of various data collection methods, such as interviews with observations. This allows researchers to identify congruence or differences between data from various sources, strengthening the conclusions drawn.

In the evaluation stage of observation and interview results, this study follows the following critical steps: Preparation of Research Instruments: Research instruments, such as interview guides, observation sheets, and document analysis formats, were developed to collect relevant and accurate data; Verification of Data Sources: Re-verification of data sources was carried out to ensure that the information obtained was valid and reliable; Data Validity Check: Methods such as cross-checking between data sources and strict coding techniques were used to analyze interview data. Weisz, et al. [17] emphasized that these steps are essential to ensure that the research results are accurate and accountable. Careful evaluation of the data collected helps researchers construct solid arguments and support the findings obtained so that the results of this study significantly contribute to the understanding of the topic being studied.

3. Results and Discussion

Table 1 shows the number of agricultural businesses in Maros Regency. Based on the data in Table 1, which shows that there are 45,427 individual agricultural businesses in Maros Regency out of 45,443 agricultural businesses, agricultural extension programs are critical. This is because agricultural businesses in the region are dominated by individual agricultural businesses, which small farmers or families usually manage. These individual farmers often need support in the form of knowledge,

technology, and better agricultural practices to increase the productivity and sustainability of their businesses.

Table 1.

Number of Agricultural Businesses in Maros Regency.

Regency/City	Number of Individual Agricultural Businesses, Legal Entities Agricultural Companies, and Other Agricultural Businesses			
	Individual Farming Business	Legal Entity Agricultural Company	Other Agricultural Businesses	Amount
Maros	45.427	8	8	45.443

Source: BPS, Area Sample Framework Survey (KSA)

Agricultural extension workers in Maros Regency have a critical main task in supporting the empowerment of farmer groups that have been formed and officially registered at the Maros Regency Government Office. Their role covers various aspects crucial for developing the agricultural sector in the area. First, agricultural extension workers assist and facilitate farmer groups to improve their skills and knowledge related to more effective and efficient agricultural practices. This includes training and guidance to strengthen farmer's capacity to manage land, select superior seeds, and implement modern agricultural techniques to increase yields.

In addition, agricultural extension workers also act as liaisons between farmers and the necessary agricultural resources, including access to seeds, fertilizers, agricultural tools, and the latest agricultural technology. With better access to these resources, farmers are expected to optimize their land's productivity to increase agricultural yields significantly. Extension workers also assist farmers in understanding and adopting relevant new agricultural technologies, such as modern irrigation systems, environmentally friendly pesticides, and precision farming methods that can reduce production costs and minimize negative impacts on the environment.

The increase in productivity achieved through the guidance of agricultural extension workers not only has an impact on the economic welfare of farmers but also has broader implications for the sustainability of agriculture in Maros Regency. Agricultural extension workers promote sustainable agricultural practices that can maintain ecosystem balance, reduce soil degradation, and maintain land fertility in the long term. Thus, the programs run by agricultural extension workers align with the vision and mission of the Maros Regency Agriculture and Food Security Service, which focuses on improving the quality of sustainable agricultural development and contributing significantly to regional economic growth.

3.1. Form of Agricultural Extension

The Maros Regency Food Extension and Security Agency is vital in managing and supervising agricultural extension activities in its area. In particular, this agency focuses on the economic sector, with the primary objective of improving farmer welfare by increasing productivity and income from the agricultural sector. However, the role of the Maros Regency Food Extension and Security Agency is not limited to being a provider of information (communicator) regarding agricultural and economic techniques but also includes functions as a facilitator, mediator, and motivator for farmers.

The Maros Regency Food Extension and Security Agency is a crucial facilitator in supporting farmers to adopt better and more sustainable agricultural practices. Facilitators in the agricultural sector serve as a vital link between farmers and resources that can increase their productivity, including the latest agricultural technologies. Recent research highlights the importance of facilitators in helping farmers access and adopt new technologies that can increase their efficiency and yields. This technology includes various modern tools and methods, such as mobile applications, online platforms, and educational technologies, which effectively transfer knowledge and improve farmer's skills [18]. In addition, the role of facilitators has also been proven significant in programs such as the Farmer FIRST Programme in India. This program uses a participatory and multidisciplinary approach to encourage the

adoption of better agricultural practices. Studies have shown that facilitators in this program have successfully helped increase farmer's income, cropping intensity, and nutritional security through this approach [19].

The Maros Regency Food Security and Extension Agency plays a vital role as a mediator in bridging communication between farmers and various stakeholders, including agricultural input providers, the central government, and financial institutions. As a mediator, this agency ensures that farmers get access to the necessary knowledge and resources and are also connected to research institutions, the government, and technology providers. This role is described by Rai, et al. [20] where agricultural extension services function as intermediaries connecting farmers with various institutions to improve agricultural productivity and sustainability by transferring knowledge and technology. The success of these extension services largely depends on their ability to facilitate the flow of knowledge and technology from research institutions to farmers. This is key to increasing agricultural productivity and creating a more sustainable system. In addition, as emphasized by Wonde, et al. [21] an effective mediation process, carried out through training and extension, not only contributes to increasing crop productivity but has a positive impact on increasing farmer household income. By acting as a mediator, the Extension and Food Security Agency of Maros Regency ensures that farmers in the area can adopt better agricultural practices. Ultimately, this role supports improving farmer welfare and strengthening food security in Maros Regency.

The Maros Regency Food Security and Extension Agency is a vital motivator in the agricultural sector. The primary role of this agency is to inspire and encourage farmers to continue to develop and innovate in their agricultural businesses. By providing encouragement and guidance, this agency seeks to assist farmers in adopting new technologies and better agricultural practices [22]. This approach is critical in ensuring that the innovations implemented by farmers are to their local conditions. This aims to increase the productivity and sustainability of farming businesses. This agency adopts a multifunctional approach expected to provide more comprehensive support to farmers. Thus, it is expected to help them overcome various challenges in the agricultural sector and encourage increased welfare and economic success of agriculture in the Maros Regency. Agricultural extension must cover various aspects relevant to the development of the agricultural sector, including technical, social, economic, and environmental aspects. According to Rogers, et al. [23] effective extension must consider the complexity of the agricultural system, including an understanding of cultivation techniques, land management, agricultural product marketing, and environmental impacts. In addition, the importance of a holistic approach that integrates local knowledge with technological innovation and sustainable agricultural practices. This approach aims to increase productivity while preserving natural resources. Therefore, comprehensive agricultural extension focuses on more than just technology transfer and farmer empowerment. This involves capacity building and strengthening community networks, ultimately creating independence and sustainability in agricultural practices.

Technical Aspects include knowledge and skills in cultivation techniques, use of agricultural tools and machines, soil management, and control of pests and plant diseases. Technical extension should be based on best practices and the latest innovations relevant to local conditions. Rogers, et al. [23] highlighted that adopting new technologies is greatly influenced by how well the technology is understood and integrated into daily practices. Therefore, technical extension needs to be carried out practically and demonstratively, allowing farmers to apply the knowledge gained in the field directly.

Social Aspects involve understanding the dynamics of rural communities, gender roles, and social networks in farming communities. Extension must be sensitive to the local social context so the program can be widely accepted and adopted. Chambers [24] emphasized the importance of a participatory approach that involves the community in program planning and implementation. Extension becomes more responsive to local needs and conditions by actively involving the community, making the results more effective.

The Economic Aspect focuses on improving farmer welfare through resource optimization, access to markets, and increasing the added value of agricultural products. Economic extension should include

financial management education, credit access, and effective marketing techniques. Schultz [25] showed that increasing agricultural productivity is closely related to farmer's ability to manage their economic resources. Extension focusing on this aspect can help farmers increase income and reduce the risk of loss.

The Environmental Aspect emphasizes practices that maintain environmental sustainability, such as sustainable agriculture, soil and water conservation, and environmentally friendly fertilizers and pesticides. Pretty [26] showed that successful extension integrates sustainability principles, ensuring agricultural practices do not damage the ecosystem. This extension must introduce organic farming, agroforestry, and crop rotation systems to maintain soil health and biodiversity. Although often overlooked, the policy aspect is essential to agricultural extension. Farmers need knowledge about government regulations that affect the agricultural sector, such as subsidies, environmental regulations, and land tenure rights. Antwi-Agyei and Stringer [27] emphasize the importance of an adaptive extension system to climate change and the need for policies that support such adaptation at the farmer level. By addressing all these aspects comprehensively, agricultural extension can provide farmers with more holistic and practical support.

The interviews with several research informants, namely SF, LA, TA, KA, SM, and HN, show that the implementation of agricultural extension in Maros Regency is still very focused on socio-economic aspects. The current extension discusses more topics related to increasing income, financial management, and the economy of farmer households. Although these socio-economic aspects are essential, informants feel that the scope of extension should be expanded to include other topics that are also relevant in the context of agriculture in Maros. The informants stated that discussions on technical agricultural conditions, savings and loan systems for access to capital, soil and plant health, and education on the latest agricultural technology must be added. In addition, access to agricultural inputs such as fertilizers, seeds, and pesticides is also an important aspect that currently needs more attention. They argue that broader extension will be more effective in empowering farmers because it covers various aspects that directly affect the productivity and sustainability of their farming businesses. There needs to be more than an extension that only focuses on the economy to address the complexity of the challenges farmers face, especially regarding agricultural techniques and access to essential services such as education and health.

On the other hand, SH, one of the informants interviewed, provided a different perspective. According to SH, the Maros Regency Government is collaborating with several other government agencies to expand the scope of agricultural extension to be more comprehensive. SH stated: "In its journey, the Maros Regency Government is currently collaborating with several government agencies in order to make agricultural extension activities a success. From the results of the collaboration that we have carried out together with government agencies in Maros Regency, the expected output is to cover all aspects needed by farmers, especially for those who do not yet have the knowledge and skills." (Interview on February 28, 2024)

This statement shows the efforts of the Maros Regency Government to respond to the broader needs of farmers. This effort involves various agencies to provide more holistic support, including aspects that previously may have yet to be the main focus of extension, such as education and health. This step is expected to improve the welfare and success of agricultural businesses in Maros Regency.

From the interview results, it can be concluded that although the Maros Regency Extension and Food Security Agency has made efforts to support the improvement of farmer's economies, several important aspects still need to be extended. Aspects that have not received sufficient attention include education, health, and increasing knowledge and skills that are greatly needed to support farmer's welfare and economic success. Therefore, the agricultural extension program in Maros Regency needs to integrate a more holistic approach. This approach should not only focus on the economic aspect but also include aspects of education and health that can support the productivity and sustainability of farming businesses. Through cooperation with various agencies, the Maros Regency Government is

expected to be able to create a more comprehensive and effective extension program. With this step, it is hoped that extension can truly empower farmers and improve their welfare in the long term.

3.2. *Tasks of Agricultural Extension Worker's Visits*

Agricultural extension activities in Maros Regency play a crucial role in improving the skills and knowledge of farmers, with the primary objective of improving the quality and quantity of agricultural products. One of the main tasks of agricultural extension workers is to visit farmer groups regularly. Regular visits by agricultural extension workers to farmer groups are essential because they help ensure that the information provided is relevant and by dynamic field conditions. According to studies in Ghana and Zambia, these regular interactions enable extension workers to assess farmers' specific needs and provide timely solutions, which directly impact increasing agricultural production [28]. In addition, research in Nigeria found that consistent access to extension services, including regular visits, greatly assists farmers in dealing with challenges such as climate change and market uncertainty, improving their welfare [29]. Through these visits, extension workers are expected to be able to provide ongoing guidance and encourage farmers to adopt more effective agricultural practices. Furthermore, the approach taken by agricultural extension workers is usually a group approach, where farmers are gathered in groups to be given knowledge and training together.

However, the interviews with several research informants showed a mismatch between the approach taken by extension workers and the needs of farmers in the field. One informant, SF, said that the group approach is often ineffective because gathering all farmers to sit together at once is difficult. Farmers prefer an individual approach to get more personal guidance according to their specific needs. The informant also criticized the schedule of visits by extension workers every Monday. According to him, agricultural extension workers often only come for a short time, at most 30 minutes, because they have other jobs outside that prevent them from providing enough time to conduct in-depth extension.

Various extension approaches can be used flexibly and strategically to determine the most effective and efficient agricultural extension in Maros Regency. In a diverse environment, where farmers may have different levels of accessibility and preferences for information, choosing the right approach is very important. For example, as Rogers, et al. [23] described, an individual extension approach can be efficient for farmers who need exceptional guidance or have specific problems that must be addressed. This extension allows for a more personalized approach and can be tailored to the unique needs of each farmer. On the other hand, extension through mass media, can reach farmers in remote areas in Maros quickly and efficiently, especially when disseminating vital information widely, such as regarding weather changes or pest threats.

Meanwhile, with the increasing use of information technology among farmers, the ICT-based approach described by Rivera and Qamar [30] is very relevant. This technology allows for the rapid delivery of information through text messages or agricultural applications, which can help farmers make timely decisions. The demonstration method, as described by Ban and Hawkins [31] can also be applied in Maros to directly demonstrate innovative agricultural practices to groups of farmers, which may further convince them to adopt new technologies. By utilizing these various approaches, extension workers in Maros Regency can evaluate and determine which methods are most effective and efficient, depending on the specific situation and needs of the farmer groups being served. The right approach will ensure that extension messages are delivered optimally in terms of achieving extension objectives and using available resources.

SF noted that agricultural extension workers in Maros Regency often showed optimal work performance, especially during assessment or selection activities for the best extension workers held by government agencies. At these moments, extension workers appeared more severe in carrying out their duties and tried hard to gain sympathy and support from farmers. They prioritized field visits, increased interaction with farmers, and conveyed information more effectively, perhaps because of the incentives or recognition expected from the assessment activities. However, problems arose when assessment or selection activities were not taking place. During this period, the dedication and commitment of

extension workers were often questioned. Their visits to the field became less routine, and interactions with farmers were only sometimes due to the needs or challenges faced by farmer groups. The lack of consistent supervision or motivation outside of assessment moments can result in a decline in the quality of extension, where farmers may feel that extension worker visits do not provide significant benefits or do not directly address their problems. This situation shows that although assessment activities provide temporary encouragement for extension workers to improve their performance, the sustainability of their dedication in the long term is still a challenge. Developing a system that can consistently motivate and ensure extension workers' commitment, even outside of evaluation moments, is essential. This may involve increased training, regular supervision, or more sustainable incentives to ensure that extension remains effective and responsive to farmers' needs over time.

Based on the data obtained from the interviews, it is clear that the approach implemented by agricultural extension workers in Maros Regency still needs to be fully effective in meeting the needs of farmers. More minor and in-depth visits can help farmers progress and improve human resources (HR) quality. If this condition continues, efforts to improve the quality and quantity of agricultural products in Maros Regency will be hampered, and the objectives of the agricultural extension program will not be optimally achieved. Therefore, it is necessary to evaluate and adjust the extension strategy to be more in line with the needs of farmers, including the possibility of accommodating a more personal, individual approach.

3.3. Extension Techniques in Agriculture

Agricultural extension in Maros Regency plays an essential role in developing the capacity of farmers so that they can adopt better and more sustainable agricultural practices. The main objective of this extension is to improve the skills and knowledge of farmers through various techniques and methods tailored to local needs. In carrying out their duties, agricultural extension workers strive to provide comprehensive support to farmer groups, ensuring that every farmer has access to the latest information on land management, agricultural technology, and other innovations that can increase their agricultural productivity.

The extension methods applied in Maros Regency generally focus on group socialization. This method is designed to disseminate important information on land management techniques and the latest agricultural technology. This group socialization usually involves gathering farmers in groups organized by extension workers, where they can receive extension materials that are delivered in a structured manner. The materials provided include rice field management techniques or the latest agricultural technology. This covers various aspects, such as efficient fertilizers, modern irrigation techniques, integrated pest control, and the application of sophisticated agricultural tools.

According to SF informants, the agricultural extension team in Maros Regency has implemented various socialization methods to provide in-depth insights into effective land management methods. One method that is often used is socialization activities that are directly aimed at members of farmer groups. In this activity, extension workers present material that includes methods of managing rice fields, both through simple methods and by using the latest agricultural technology that continues to develop. This technology includes innovations that can help farmers increase crop yields and work efficiency.

However, SF also acknowledged that although this socialization aims to introduce more advanced agricultural technology and increase farmer knowledge, its implementation has significant challenges. One of the main challenges faced is the gap in understanding and adaptation to new technology among farmers. Not all farmers can quickly understand and apply the material presented by the socialization team. Some farmers understand understanding or need to be faster to digest all the information presented, which ultimately impacts the effectiveness of adoption.

This challenge shows that the group socialization method, although effective in reaching many farmers at once, may only sometimes be adequate in ensuring that all farmers can fully understand and apply the new technology introduced. Therefore, a more adaptive and personalized approach is needed to address this gap. One solution that can be considered is to conduct extension services individually or

in small groups that allow for more direct and in-depth interaction with farmers. Extension services on a smaller scale allow extension workers to pay more specific attention to each farmer, answer their questions in more detail, and help them overcome the difficulties they may be facing.

In addition, agricultural extension workers in Maros District can also consider introducing additional training sessions specifically designed for farmers who have difficulty understanding new technologies. These training sessions can focus on hands-on practice, where farmers can try out new technologies with direct guidance from extension workers. This will help farmers understand how to use the technology and increase their confidence in implementing these innovations in their daily farming activities.

Evaluation and adjustment of extension methods are critical in this context. Extension workers need to periodically assess the effectiveness of their methods, identify the constraints farmers face, and make necessary adjustments to improve expected outcomes. With a more structured approach, a focus on individual farmer needs, and ongoing support through additional training, agricultural extension in Maros District can be more successful in empowering farmers, improving the quality and quantity of agricultural output, and supporting sustainable agricultural development in the region.

This more adaptive approach will also help reduce gaps in understanding and application of new technologies among farmers, ensuring that all farmers can use agricultural innovations optimally. Thus, agricultural extension not only functions as a tool for knowledge transfer, but also as a mechanism to strengthen farmers' capacity in facing the ever-growing challenges in agriculture. The implementation of agricultural extension in Maros Regency is shown in Figure 2.

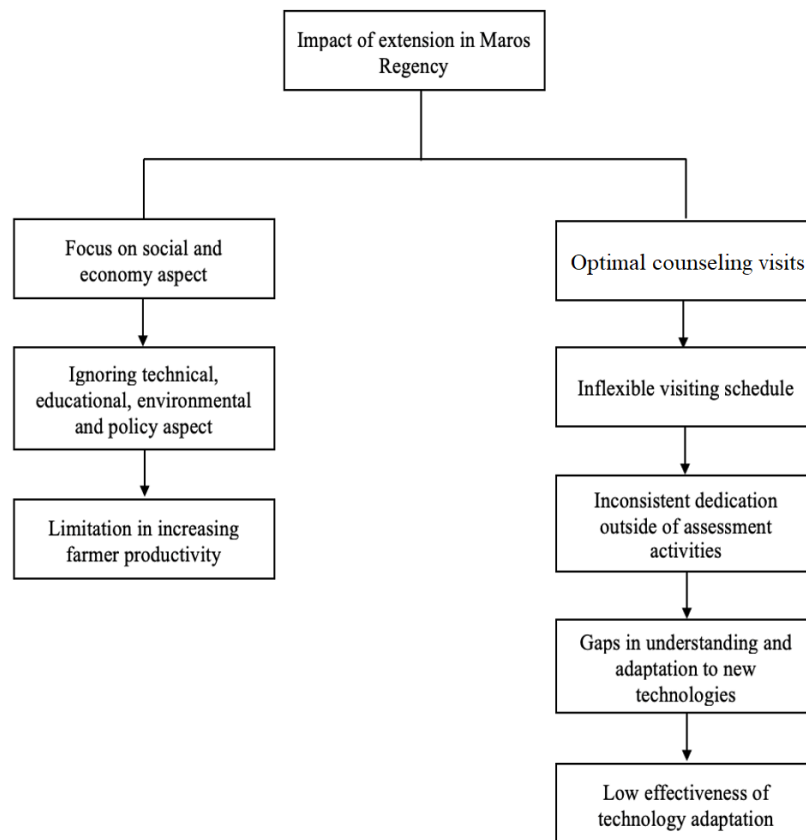


Figure 2.
Implementation of Agricultural Extension in Maros Regency.

4. Conclusion and Suggestion

Agricultural extension in Maros District is essential in improving farmers' knowledge and skills, primarily through programs focusing on rice field management, the use of agricultural technology, and integrated pest control. However, the effectiveness of extension still depends heavily on the ability of extension workers to adapt delivery methods to farmers' needs and understanding. Routine assignments and visits by extension workers have helped to disseminate important information. However, there are still challenges in ensuring that all farmers receive the information and support they need equally. The group socialization technique applied effectively reached many farmers at once. However, not all farmers could quickly understand and apply new technologies, indicating the need for a more personal and interactive approach.

Several suggestions can be made to improve the efficacy of extension services and solve the difficulties experienced by farmers and extension workers in light of the results and analysis of agricultural extension activities in Maros Regency:

1. Adoption of a Hybrid Extension Approach

To guarantee success and inclusivity, extension workers should blend group and individual techniques. Small-group or individual sessions can offer tailored advice and address particular problems, while group socialization is helpful for spreading broad information. This two-pronged approach can improve farmers' knowledge and use of cutting-edge farming techniques.

2. Enhanced Capacity Building and Training

Agricultural extension employees should participate in regular training programs to improve their technical expertise and people skills. The application of cutting-edge agricultural technologies, efficient communication techniques, and approaches to working with farmers from various backgrounds can all be the main topics of these programs.

3. Integration of Extension Services Based on ICT

Extension agents should use ICT-based strategies including online platforms, SMS alerts, and mobile applications, given the growing accessibility of digital technology. These resources can enable farmers to make well-informed decisions and speed up the timely distribution of information, especially in rural areas.

4. Constant Observation and Assessment

To determine how extension operations affect farmers' production, knowledge, and abilities, a system for routine monitoring and assessment should be put in place. This system may find service delivery gaps and offer data-driven suggestions to enhance extension tactics.

The Maros Regency's agricultural extension system can better meet farmer requirements by putting these recommendations into practice, which would increase the region's agricultural sustainability and productivity.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Acknowledgments:

The researcher would like to thank all informants and parties involved who played a role in the research and writing of this article, especially the Sociology Study Program, Faculty of Social and Political Sciences, Sawerigading University Makassar, for the research environment provided.

Author Contributions:

The idea and design of the study were contributed to by all authors. AS conducted the data analysis and literature search. AS wrote the original draft of the manuscript, HN and AR provided feedback on earlier drafts. The final manuscript was read and approved by all writers.

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